

Missionary work in the rain forest

Norman Myers

The Geophysiology of Amazonia: Vegetation and Climate Interactions. Edited by Robert E. Dickinson. Wiley:1987. Pp. 544. £69.40, \$72.50.

AMAZONIA is such a highly integrated ecosystem, with myriad interactions at multiple levels, that we — whether scientists, conservationists or developers — need to approach it with as much interdisciplinary spirit as we can generate.

“So what else is new?” might be the response of a cynic. Three things are new. First, we are beginning to understand just how little we understand about Amazonia. For sure, we know much more than we did in 1970, notably about the region's soils, its nutrient flows and other components of the system. But we have all too few insights into how the components fit together, how they *work*. Secondly, much of Amazonia is undergoing extremely rapid change. Some areas are suffering deforestation at rates that have increased by a factor of 13 in just 10 years. Thirdly, and arising from the other two, Amazonia is presenting a greater challenge to science than has sometimes been supposed. Its predominant feature is not so much its biotic richness, with its millions of species, but its ecological complexity, with intricate interaction of those species among themselves and with their physical environments. This last factor applies especially to the dynamic linkages between the region's vegetation and its climate. Hitherto it has been widely believed that forests do not affect rainfall. Now evidence is emerging that there could be feedbacks between deforestation and precipitation patterns.

To generate a response of sufficient scope, science needs to develop an intellectual framework that, according to James Lovelock, one of the contributors to the book under review, should rank as “a new discipline of geophysiology”. The field should encompass the phenomena, functions and processes of the biosphere and its support systems; and its study should be a mission-orientated affair,

New in paperback

Harvard University Press has re-issued three of its best-selling science books from 1985:

- *Revolution in Science* by I. Bernard Cohen (reviewed in *Nature* 315, 433; 1985). Price is \$9.95, £7.95.
- *Niels Bohr: A Centenary Volume* edited by A.P. French and P.J. Kennedy (reviewed in *Nature* 320, 221; 1986). Price is \$14.95, £11.95.
- *The Dialectical Biologist* by Richard Levins and Richard Lewontin (reviewed in *Nature* 320, 23; 1986). Price is \$8.95, £7.25.

“directed toward procedures for the diagnosis and prevention of planetary maladies”. Nothing like being imaginative, not to say ambitious.

To promote this cause, in 1985 the United Nations University convened a conference “Climatic, Biotic and Human Interactions in the Humid Tropics”, with emphasis on Amazonia. This book presents the proceedings, and a fine publication it is. Broad ranging in purpose, eclectic in spirit and pioneering in accomplishment, it meets the needs of the times. After all, if rampant deforestation in Amazonia triggers climatic dislocations, whether in the region itself or elsewhere in Brazil (what if there were less rainfall in southern Brazil with its rich farmlands?), the repercussions could be pervasive and irreversible. As several papers in the book show, an outcome of this sort is far from unlikely — and there may even be effects on climate further afield.

In addition to Lovelock's overview paper, the book contains a first-rate account of some climatic mechanisms in the humid tropics by Robert Dickinson,

who also serves as the book's editor; an up-to-date review of deforestation in Amazonia by Philip Fearnside; a critical assessment of the tropics' contribution to atmospheric chemistry by Paul Crutzen; and several illuminating analyses of biogeochemical cycles, soil productivity, plant-animal interactions, micrometeorology, trace gases, albedo, general circulation models and hydrological cycles by luminaries such as Wolfgang Seiler, Rattan Lal, Ghilleen Prance, Luiz Molion, Eneas Salati and Ann Henderson-Sellers.

I wish there had been more on remote-sensing technologies for inventory and monitoring research, on the biotas as a growing source of atmospheric carbon dioxide and on “fertilizer effect” feedbacks of a greenhouse-affected biosphere. But no matter. This is a splendid book which portends well for Wiley's series “Climate and the Biosphere”. □

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Take Manhattan

Clive Ellory

The Ca²⁺ Pump of Plasma Membranes. By Alcides F. Rega and Patricio J. Garrahan. CRC Press: 1986. Pp.173. \$76 (United States), \$87 (elsewhere).

ALTHOUGH control of intracellular calcium levels is central to current ideas in cell physiology, the calcium pump of plasma membranes has been reviewed to a far more limited extent than its close relatives, the sodium pump and the calcium pump of the sarcoplasmic reticulum. This monograph by Rega and Garrahan sets out to redress the situation.

Stylistically it is an unusual work. It lacks a preface, introduction or concluding summary, and is presented strictly as a review, although illustrated with carefully chosen, benchmark figures. In places the book is very good. There is a brief and lucid description of the development of ideas which gives the relevant experimental evidence. However, as is so often the case with monographs impinging on vast topics such as the control of intracellular Ca, the problem is unevenness. The authors begin with chapters on the methodology of Ca measurement, and the role of Ca in cellular function. The first of these suffers from obsolescence; there is, for example, no mention of fura-2. The second is an attempt to cover such an enormous area that omissions and imbalance are inevitable. Thus it seems unjustified to describe Ca-activated K-channels almost exclusively in terms of the

red cell Gardos channel, dismissing all other cell types in a few sentences.

In fact it is clear that the authors' first love is the erythrocyte, and that they are happiest with enzyme kinetics and detailed partial reactions of the red-cell Ca pump, which are covered fully and very well. Certainly, the chapter on purification justifies the choice of the erythrocyte for most biochemical studies. It also emphasizes the low membrane abundance of this calcium pump, compared with other transport systems. The importance of calmodulin arises in two contexts, purification and regulation. Finally other modulators and inhibitors are also considered.

In general the writing is clear and readable, although there are some rather untidy orthographic errors and an occasional awkwardness stemming from too-direct translation of Spanish syntax. Overall this is a useful book, which will be a convenient review for those interested in the plasma membrane Ca ATPase.

In conclusion, I must say that the partisan emphasis on the red cell reminded me of the famous *New Yorker* cartoon of the world where Manhattan firmly occupies most of the foreground, the East Coast, the rest of the United States and the world being represented with progressively greater compression. As a self-confessed devotee of the red cell I appreciate the importance of the erythrocyte as a model system. But in the context of calcium transport other cell types should also get their fair share of attention. □

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